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ABSTRACT

A study examined the role of guidance in girls' decisions about whether or not to take technology education as an elective in high school and to consider future careers in technological fields. The researchers reviewed the literature on guidance and looked at the results of interventions designed to attract girls to nontraditional fields. Eighteen guidance counselors in three school districts in Connecticut were interviewed. Three barriers to greater participation of girls in technology education were identified: lack of information, lack of connection, and lack of flexibility. Guidance counselors agreed that students were not well informed about technological careers and tended to see careers as male and female. Girls in middle schools failed to make the connection between what they were learning in technology education classrooms and careers in technological fields. Many guidance counselors cited lack of flexibility as a problem in advising students to take technology education. For students entering high school, graduation requirements allowed room for no more than one or two elective subjects. Some suggested strategies to increase gender equity were as follows: make gender equity a clear focus of career days or fairs; have middle school students visit technology labs at high schools; bring guest speakers, especially women, into the technology classrooms; forge links with local business/industry; create more flexible course structures; introduce career centers in middle schools; and develop interdisciplinary courses linking technology education and other academic departments. (YLB)

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GUIDANCE, GENDER EQUITY AND TECHNOLOGY EDUCATION

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I. INTRODUCTION

In this report, we examine the role of guidance in girls' decisions about whether to take technology education as an elective in high school and to consider future careers in technological fields. This report is part of a research project designed to identify viable strategies to change enrollment patterns and attitudes towards the success of girls and women in technological fields. We analyze the impact of guidance counselors and career readiness activities and suggest strategies to increase gender equity.

The research project involved technology education classes in a middle school and the high school associated with it in three school districts in different parts of Connecticut. We wanted to look at a variety of different school districts and were able to gain access to one rural, one suburban and one urban district. For this report, we reviewed the literature on guidance and looked at the results of interventions designed to attract girls to nontraditional fields. We also interviewed 18 guidance counselors in the three districts which participated in the study.

The findings of the research project, reported in *Building Their Future: Girls In Technology Education in Connecticut* (VERTEC, September 1993), highlight how teaching methods, classroom atmosphere and teacher attitudes affected girls in their early exposure to technology education in middle school. We also examine the reasons why high school students elected to take technology education and their attitudes toward technological careers.

In *Building Their Future*, we identify several factors which tend to discourage girls from taking technology education in high school. First, stereotypes about appropriate careers for women are still operating and are reinforced by a school environment where there are very few female technology education teachers and few girls already taking technology in high school. These stereotypes, which relate specifically to girls, have a cumulative effect with a number of other factors which are relevant for both boys and girls.

Second, middle school students don't know enough about technological careers, lack basic information about careers in general and are sometimes unaware of what technology education classes are available in high school. Beyond this lack of knowledge, however, is the problem that middle school students don't connect what they are learning in the classroom with careers and are uninformed about economic realities and the world of work.

A final factor is that technology education must compete with other elective subjects under a relatively inflexible course program, particularly for "college bound" students. Technology education may also receive less credit than core "academic" subjects.

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II. THE ROLE OF GUIDANCE

Guidance counselors provide information and advice, and career readiness programs can give students the opportunity to explore different options. In our survey of high school students taking technology education, however, we found that only 10% of girls picked "my guidance counselor said I should take it", as a response to the question of why they decided to take technology education. A surprising 28% percent of girls chose to write in "myself" as the sole response to the question asking students to identify the person or persons who most encouraged them to take technology education.

The survey suggests that, at least in the minds of the students, guidance counselors play a limited role in decisions about future careers and what electives they should take in high school. This is supported by interviews with middle school girls which indicate that they are not well informed about technological careers. In this report, we identify three barriers to greater participation of girls in technology education: (1) Lack of Information, (2) Lack of Connection, and (3) Lack of Flexibility.

We believe guidance can play a more active role in breaking down these barriers by insuring that girls keep their options open, by countering negative stereotypes about nontraditional careers for women, and by helping make the connection between skills acquired in technology education classes and careers. In order to accomplish these goals, however, school guidance programs have to make a commitment to gender equity and school systems must be willing to put priority on making resources and training available to guidance counselors to develop activities designed to improve gender equity.

Lack of Information

Guidance counselors we interviewed agreed that students were not well informed about technological careers. The staff of one middle school conducted a gender equity survey and found that students did not know the meaning of terms such as technology education or vocational education. The counselors also said that the students tend to see careers as male and female.

The resources available to middle school students to learn about different careers have been reduced in many schools in recent years because of budget cuts. Counselors at two of the middle schools in the study said that the closing of career centers at their schools has made it more difficult to provide information to students. Previously, students rotated through the career centers as part of their program in order to explore different career possibilities, often with the use of computer programs.

Counselors at one of the middle schools we studied said they don't have the time or resources to provide a lot of specific information about careers. A counselor at another middle school felt that in the 1970s there was much greater emphasis on vocation, but this has been lost in recent years. He regrets that with the increased emphasis on achievement tests, counselors no longer have the chance to give students vocational tests designed to identify their areas of strength and interest. In contrast, counselors at one of the middle schools give 8th grade students the Harrington-O'Shea survey over several days. After they get the results of the tests, they see 8th graders individually to set up their schedules for high school.

High school counselors agreed that students coming into 9th grade do not have enough information about careers, particularly about salaries and promotion prospects in various occupational areas. One counselor at a high school said that a lot more needs to be done earlier to keep students' options open, particularly for girls to consider nontraditional careers. He said that girls often see work as either some kind of profession, like lawyer or doctor, or work in an office or store. They don't realize there are a lot more options, especially in technological fields.

Counselors at one high school felt that parents also need to be better informed. This was supported by counselors at a different middle school, who said that some parents are more accepting of their daughters going into professional careers than blue collar occupations. Counselors in all the schools mentioned the difficulties in getting parents involved and informed about career options.

The main forums for allowing students to explore different careers in most schools are "career fairs" or "career days", which are usually held in auditoriums or gymnasiums for one or two days. Counselors invite people from different occupations in the local community to come in and talk to students. It is essential that gender equity be incorporated in all of these activities in order to break down stereotypes about "male" occupations. Counselors must make an effort to attract female role models working in nontraditional occupations to career fairs and insure that presentations are balanced.

A further option is to organize career activities specifically to introduce students to options nontraditional for their gender. Interventions designed to attract girls to careers in math and science have been attempted in various parts of the country. While there have been few follow-up evaluations of these special programs, in one example, six months after attending a one-day career conference, girls' math and science career interests and course-taking plans were higher than they were prior to the conference (Anton and Humphreys, 1992:29).

However, as Alma Lantz points out, (Chipman, Brush and Wilson, 1985:329-354), career workshops conveying information about the importance of mathematics to future vocational options do not necessarily alter career values or occupational aspirations. She maintains that conferences which do not involve active participation or role models who can convey enthusiasm for their chosen careers may have only limited impact.

In addition to providing general information about different careers, guidance programs must provide middle school students with information about the range of technology education classes available in high school and encourage girls to consider nontraditional options. In our interviews with girls in middle school, we found that they lacked specific information about the range of technology education classes available in high school. In one of middle school, counselors admit that students are not well informed. In the past, they had teachers come from the high schools to talk about their programs, but they found this too time consuming because of all the different elective areas involved.

Another middle school has overcome this problem by holding an "electives fair" where teachers from all the elective areas in the high school come to the middle school to talk to students. A counselor at this school feels that this gives students a pretty clear picture of the electives that will be available to them. Another means of providing information to middle school students considering what electives to take would be for them to visit high school technology education labs and see the kinds of equipment used and the work being done. This would be especially valuable in districts where much of this equipment is not available for exploratory programs in the middle schools.

Lack of Connection

In addition to the lack of information about career options, we found that girls in middle school failed to make the connection between what they are learning in technology education classrooms and careers in technological fields. As one counselor in a middle school put it, "we are getting skill acquisition in a vacuum". Part of the reason for this "vacuum" is the lack of knowledge about the world of work and economic realities. Counselors in all the middle schools pointed out that students are at an age when they find it difficult to imagine themselves working in the real world. As counselors at one school pointed out, this lack of connection is not helped by what they are watching on TV, which doesn't represent reality and has few role models of women in nontraditional occupations.

Besides a lack of knowledge about what careers are available in technological fields, students in middle school are not well informed about the salaries, prospects for promotion or preparation necessary for such careers. When counselors in one middle school reviewed the reading materials about careers available in the technology education department, they found that many were not at an appropriate reading level or didn't provide the information necessary to allow students to relate what they were doing in class to technological careers.

The counselors at this school are therefore developing a curriculum which will involve co-teaching between technology education teachers and guidance counselors. For example, if students are working on building bridges as a hands-on project, the guidance counselors will develop materials to talk about careers in engineering and construction. The counselors will teach 2 lessons per quarter and may bring in guest speakers.

Normally, these kind of activities are done on special career days, but the counselors developing this initiative feel a better connection will be made if it is taught in the classroom along with the students' hands-on projects. An explicit part of this initiative is gender equity, with materials and presentations designed to get girls in technology education classes to think about careers like engineering and dispel stereotypes about male occupations.

Counselors at an other middle school told us they did not have the resources or time to work with teachers in the classroom. One counselor felt that teachers didn't want to take the time from their regular curriculum for such initiatives. This attitude reflects a very limited view of the guidance counselors' job and a resistance to other ways of working, such as collaborative efforts with teachers or small group work. Unless guidance counselors are willing to work with teachers to integrate guidance into the curriculum and help make a better connection to the world of work, students will see guidance as a marginal activity.

The idea of bringing in guest speakers, for example, could be set up by guidance departments without necessarily requiring co-teaching by guidance counselors. People in technological fields in the community could come in to talk to students in their technology education classes or students in these classes could take field trips to visit local industries. More schools tend to use guest speakers from the community at career fairs than in the classroom, but the advantage of inviting people into the classroom is the opportunity for technology education teachers to connect what the speakers are talking about directly with what the students are learning. Many of the teachers who we interviewed felt it would be valuable to have such initiatives.

One middle school principal is not sure that classroom initiatives necessarily make sense. She said that in 8th grade, students are not really ready to think about careers and what they need is a chance to explore the different options. She also stressed the importance of the exploratory nature of technology education. She pointed out the changes which are constantly going on in technological fields and the need to acquaint students with "the idea that they need to be flexible, that they need to acquire many different kinds of skills, that probably they will not have only one career in their life time, (and) that probably their expectations of what their lifestyle is going to be might be a little unrealistic."

As students move on to high school, they should begin to acquire more information about the world of work and specific careers. They have more opportunities to explore career possibilities through programs like job shadowing or visits to workplaces. But counselors we interviewed at the high school level admit many students still lack a sense of economic realities and an understanding of the world of work.

High school counselors don't generally have the time or resources to work in the classroom, nor do they organize visits of guest speakers. Collaborative projects with teachers, however, can be valuable. At one high school in our study, sophomores have a project in English class to write a career paper after exploring guidance materials. Counselors feel that this helps them to learn what students are thinking about in terms of careers.

One high school counselor stressed the importance of role models and giving girls a chance to meet successful women in nontraditional careers. She said that years ago they had more time in the classroom, but now they just see students to go over plans. If they suggest nontraditional careers to girls, they are asking them to be trailblazers, which is always hard. She didn't feel counselors had time to organize visits of guest speakers to technology education classrooms, but she feels it would help if schools hired a lot more female technology education teachers.

One counselor at a high school rejected the idea of taking up class time working with teachers. She stressed that with 45 minutes in a period, "special initiatives" can be very disruptive. She feels bringing in guest speakers should start earlier, even in elementary schools. Special initiatives for high school students should take place in the summer, when you don't have to compete with everything the teacher needs to cover in regular class time.

Various kinds of interventions have been tried in different parts of the country designed to attract more girls to math and science careers. These interventions usually involve summer programs and have been shown to make a difference. Two and a half years of follow-up of a two-week residential science institute for female high school juniors interested in science found that the program decreased the participants' stereotypes about people who were good in science, reduced their feeling of isolation and strengthened their commitment to careers in math and science (AAUW, 1992:29).

As the AAUW report points out, many of these programs are not a part of the official school curriculum. Some of the programs are designed to attract only girls with proven abilities in these subjects. As one high school counselor pointed out, while programs for exceptional students are valuable, they need more programs for the middle range of students.

Counselors at one high school praised the business programs which built links to the world of work and the involvement of local businesses. The principal at another high school also stressed the importance of developing links with local industries and businesses to provide students with the

opportunities for job shadowing and internships. He pointed out that school personnel met on a regular basis with local business and industry "advisors" to discuss changes in curriculum. Some local industries had provided equipment and help to the school in developing up-to-date vocational programs in their fields.

Lack of Flexibility

Many of the guidance counselors we interviewed cited lack of flexibility as a problem in advising students to take technology education. For students entering high school, there is not room for more than one or two elective subjects, particularly if they are planning to go to college. If "college bound" students are expected to take a foreign language and an arts class, such as music, there is no room for subjects like technology education.

Counselors at one high school said that with the requirements for graduation, there is really only one elective available to 9th or 10th graders. Students are required to take only one vocational and one aesthetic elective. Because technology education has a year's introductory course, if they don't take technology education in 9th or 10th grade, they are unlikely to take it at all.

This tendency to see technology as a marginal subject is reinforced by weighting systems in some school districts which give less credit for vocational subjects than they give to traditional academic subjects. There have been efforts in some districts, however, to put more emphasis on vocational training.

In one school district, there is very little flexibility for students in the first 2 years of high school to take vocational electives. Counselors told us that there has been a push to increase requirements beyond core academic subjects. They wanted to add two required courses in vocational electives, but the problem here is that they didn't have enough technology education teachers to offer additional courses.

This district is already unable to keep up with demand for technology education classes. Upperclass students are given priority in obtaining placement and only then are incoming 9th graders allocated spots in the classes they requested. As a result, many 9th graders who want to take technology classes must wait, allowing whatever enthusiasm was generated by their experiences in exploratory classes in middle school to dissipate. If schools are making efforts to encourage girls to take technology education courses, this priority system may discourage girls from pursuing these courses in their later high school years, and may be a barrier to raising female enrollments in this area.

In one high school, lack of flexibility was also cited by counselors for "college bound" students. By senior year, when many students have finished most of their college requirements and have room in their schedules, they usually dabble in other subjects of interest, but these are likely to be hobbies. Before that time, they really have only one elective.

One counselor at a middle school said they would always encourage students to explore and to take classes of interest to them, but they would be reluctant to suggest courses to students going to college which would prevent them from taking important courses (from the college's point of view) like languages or an extra year of lab science. One counselor felt that as long as colleges have requirements for admittance which don't include technological subjects, this will continue to be a problem across the state.

The principal at a different high school, however, stressed the need for more technological skills and the importance of giving students more opportunities for exploring vocational subjects. They have set up a new guidance structure which involves students in career exploration courses. As a result of each student going through the career exploration curriculum, enrollment in all vocational courses has gone up close to 30 percent.

Under this kind of system, guidance counselors discuss career possibilities not in terms of "college-bound" versus "non-college bound" students. They have to explore the kind of qualification students need to pursue a particular career, which includes a wide range of postsecondary colleges and training programs. The new structure calls for individual assessment of students, career exploration courses and student activities. This requires a career development center and an extensive program of job shadowing and internships. It also requires working with counselors in middle schools to break down the old artificial barrier between vocational and academic subjects. They have also tried to break this down through interdisciplinary programs between the technology education and the math and science departments.

Gender equity has been a focus of these changes. The principal feels that contacts with business and industry have helped promote gender equity because the workforce is changing and girls in school have the opportunity to meet successful women in technological fields. It has also involved extensive in-service training for technology education teachers.

Another innovative course structure is the introduction of tech prep programs in some school districts. These programs involve collaboration between schools, colleges and business/industry. They give students the opportunity to get job experience and take college level courses. While we did not visit tech prep programs as part of this study, they clearly provide an alternative to the standard course structure. At this point in time, however, the number of students involved in tech prep programs is still quite small.

III. STRATEGIES TO INCREASE GENDER EQUITY

Middle school students must be better informed about the career options available to them and the range of technology education courses they can take in high school. They need to make the connection between what they are doing in technology education classes and technological careers. Guidance counselors need to counter negative stereotypes and encourage females to consider nontraditional careers.

Guidance departments in all schools should work with teachers and administrative staff to establish a gender equity team charged with developing a systematic plan to address recruitment, enrollment, training and support. They should adopt a gender equity policy to set goals and develop initiatives, including training for guidance counselors, workshops for teachers, administrative staff and guidance counselors, and specific activities designed to increase gender equity. School districts should support these policies by providing resources and time for staff to develop initiatives. The State Department of Education should provide more up-to-date technical assistance to school districts, including information on technological careers and the high school courses required for pursuing such careers.

Initiatives to increase gender equity could include a wide range of different kinds of programs and activities:

- *Guidance programs (in coordination with technology education teachers) should provide more information to both students and parents about the salaries, necessary preparation and promotion prospects of various kinds of technological careers.*

- *Gender equity needs to be a clear focus in activities such as career days or career fairs at schools. Counselors must make an effort to attract female role models working in nontraditional occupations to talk to students and insure that presentations are balanced.*

- *Middle school students could visit technology education labs at the high schools to see the kind of equipment and classes available.*

- *High school teachers could visit middle schools classrooms, or there could be elective "fairs" where they discussed the kind of programs available at the high school.*

- *Guidance counselors could work with technology education teachers in the classroom to get more information to students and help make the connection between what students are doing in class and technological careers.*

- *Guest speakers (with significant representation of females) can be brought into technology education classes to discuss the world of work.*

- *Schools need to develop links with local business/industry to provide guest speakers, opportunities for field trips, job shadowing or internships.*

- *Course structures could be made more flexible, with more opportunities for students to take vocational subjects. These opportunities could be part of a career exploration guidance program.*

- *Career centers could be introduced in middle schools to provide students with more opportunities for exploration.*

- *Interdisciplinary courses between technology education and other academic departments could be developed.*

Until guidance counselors, teachers, administrators and parents work with students to provide more information and a better connection to the world of work, doors will not be opened to females to enter technological careers. Guidance counselors need to consider innovative ways of providing the information females need to be empowered. They need to find ways of attracting the interest and enthusiasm of female students and relating to their lives.

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